Back to Representationalism

Valérie Bonnardel
University of Winchester, UK
valerie.bonnardel/at/winchester.ac.uk

> Upshot • Palacios, Escobar and Céspedes consider misrepresentation and comparability in the context of the enactivist approach of colour perception. This consideration leads them to propose the introduction of a weak form of representationalism to account for internal representation of "reality" and "shared experience" and to accommodate the Bayesian principle of prior information used in machine vision. The weak representationalism is not limited to brain states but may include embodied factors to be compatible with the enactivist framework. My commentary will essentially consider the misrepresentation and comparability arguments used by the authors to introduce the notion of representation.

« 1 » In their target article, Adrián Palacios, María-José Escobar and Esteban Céspedes define misrepresentation or illusion as follows: an object *o* has some properties *F*, according to some perceptual experience, but in "reality," *o* does not have *F* (§7). To illustrate misrepresentation they present a picture of a coloured Rubik's cube. It should be noted that the observer is viewing an object's image, not an object in its lived environment. This point is important if we are to consider misrepresentations in an ecologically valid context taken as the relevant domain of observation for an enactive account of perception. From this image, the misrepresentation concerns the colour mismatch between the central square patches of the frontal and the top sides of the cube despite having the same chromaticities or colour (as can be seen when patches are surrounded and somehow isolated by black circles, Figure 3 right). The misrepresentation consists in claiming that we attribute the property of colour mismatch *F* to the image of the object *o* while in "reality" there is none. The Rubik's cube illusion is further explained by the authors:

> "A subject finds itself in a perceptual experience *e* of illusion just in case *e* occurs in some anomalous perceptual context (which contains some relevant set of physical states *p*) and *e* would differ considerably if it occurred in a normalized perceptual context (which also contained *p*)." (§40)

« 2 » Contrarily to the authors, I would like to argue that the image of the Rubik's cube elicits a misrepresentation-revealing mechanism that is normally at work to ensure a veridical representation of the state of affairs in the lived world. When looking at the image of an object, as opposed to the 3D object that is comprehended within the lived experience's complexity, we must make an interpretation to ascribe meaning to an otherwise impoverished visual stimulus (i.e., 2D instead of 3D and absence of proper sensorimotor activities), that is, there are not many relevant sets of physical states *p* attached to the perceptual experience *e*. Looking at Figure 3, one does not see a bi-dimensional array of black-and-white or coloured patches but a Rubik's cube lit by an upper-right illuminant casting its shadow on a checked-pattern surface. The 3D cube percept is induced by linear perspective indicators and, for instance, the smaller size of the back-left corner white patch as compared to the front-right corner green, does not strike the observer as being different in size, rather it is consistent with what would be the size proportion of a 3D cube image projected on the retina and thus provides a coherent 3D representation of the cube. Likewise, in the lived environment, the colour signal that reaches the retina $C(\lambda)$ is the product of the illuminant $E(\lambda)$ by the surface reflectance $S(\lambda)$. If the central patches from the two sides of the cube share the same reflectance, and the light intensity is reduced on the frontal side, as we are led to believe, because of the shadow $[E'(\lambda)]$, then the colour signal will change accordingly $[C'(\lambda)]$. Yet, despite the change of illuminant, the colour signal from the two patches is the same, in this condition, our perception is forced to conclude that two patches do not share the same reflectance; their colour is different. The illusion arises as the change of illuminant is not taken into account in the representation of the patch's colour and the misperception is coherent with the shadow assumption; the same coloured patch appears brown on the illuminated side and orange on the shadowed side. In the lived environment, accounting for the illuminant to ascribe colour to surfaces is of course more "veridical" than relying on the colour signal. The Rubik's cube trick thus reveals aspects of the colour constancy mechanism that allows us to keep a relatively stable colour appearance of surfaces in a light-changing environment, which is more veridical than relying on the colour signal that reaches the eye.

« 3 » If the images may have a limited ecological value in evidencing genuine misrepresentations, there are some good examples occurring in the natural environment. For instance, coloured shadows can be observed at sunset, when sunlight is getting dimmer and light from the sky is still bright. Coloured shadows, first reported by Leonardo da Vinci, can be described as follows: when an opaque object is lit by two light sources of different colour (say white *W* and yellow *Y*), the illuminated object casts two shadows (W' and Y') intercepting the light from each source (*W* and *Y*). Consequently, each light source illuminates the shadow produced by the other source ($W'Y$ and $Y'W$). In these conditions, the shadow (W') illuminated by the yellow source (*Y*) appears dark yellow and the shadow (Y') lit by the white light (*W*) appears bright blue, in other words, a colour that does not exist in any of the light sources (Lanthony 2006). Initially, coloured shadows were believed to result from light reflection, that is, from a physical attribute, but today they are understood as an example of misinterpretation attributable to colour-constancy mechanisms (Mollon 1995). Simultaneous colour contrast offers another example of misrepresentation. Colour contrast is observed when two contiguous coloured surfaces mutually influence each other's appearance in the direction of their respective complementary colour; an orange next to a red will appear yellower while the red will appear more violet.

« 4 » These phenomena could be referred to as misrepresentations, but to paraphrase Francisco Varela, who, after stating that there is no relationship between light and colour, insisted that it was not a para-

dox but rather an observation that should be taken to be at the heart of knowledge of colour perception,[1] coloured shadow and colour contrast are revealing something about the nature of our colour vision. Coloured shadow or colour contrast would appear as "correct" perceptual experience if, according to and in agreement with the author's definition, these phenomena are "in correspondence with the relevant enactive condition of the perceiver and its environment" (§41). Likewise, the search for properties in an independent pre-given world that would register with the uniqueness of the unique hues or the boundary of our colour categories is vain and their neurophysiological bases are still elusive (see Wuerger, Atkinson & Cropper 2005 for the former and Bachy et al. 2012 for the latter). These observations taken together are one of the very arguments (comparative argument excepted as not developed here) that called for an enactive approach, between objectivism and subjectivism views, where "colours are properties of the world that result from animal-environment codetermination" (Thompson, Palacios & Varela 1992: 21).

« 5 » The second argument concerns the question of the comparability of perceptual experience between individuals. Because of the idiosyncratic nature of enaction, where a living and autonomous organism dynamically enacts its lived environment, perceptual experience is conceivably bound to be itself idiosyncratic. Palacios, Escobar and Céspedes judge this thesis counter-intuitive and appeal to the language communality on which their intuition relies. I would argue that the idiosyncrasy of our phenomenological experience is not counter-intuitive, and evidence of shared experience, if it exists, is probably not to be found in language.

« 6 » Take the following example: instead of Susan, who is perceiving red, let us ask John, who is daltonian.[2] Pointing out a red object, John might quite rightly name its colour despite the fact that his colour vision is limited to a gamut of yellow to blue tones as judged by normal trichromats. It has been known by ophthalmologists that colour naming was of little help in colour vision assessment; Daltonians are far better at naming than ordering colours. The paradox is that unless the task explicitly requests it, daltonians will not use their better naming abilities to optimise their performance in colour ordering tasks (Jameson & Hurvich 1978). Experiments have further revealed that daltonians' colour categorisation by naming is very similar to that of normal trichromats, while their perceptual colour categorisation is impaired and contains mismatches typical of their deficit (Bonnardel 2006). Daltonians' colour perception is qualitatively and radically different from that of normal trichromats, and these differences are not limited to colour appearance but also impact multimodal sensory integration, aesthetic judgments, communication, etc. In other words, daltonians enact a world from their dichromatic embodied cognition that shares little with that of normal trichromats. Despite this world of difference, it is exceptional for daltonians to make themselves identifiable through their behaviour or their language. The assumption of comparable perceptual experience between individuals put forward by the authors to account for the observed coherence in behaviours in a given context does not appear correct nor is it necessary for a theory of perception.

« 7 » It is understandable that the notion of representations at the heart of early computer vision is still important in the development of contemporary artificial systems, but its value, even in its weak form, for an enactive approach of perception is questionable, as

> "[…] cognition is no longer seen as problem solving on the basis of representations; instead, cognition in its most encompassing sense consists in the enactment or bringing forth of a world by a viable history of structural coupling." (Varela, Thompson & Rosch 2016: 205)

1| In the DVD "Monte Grande" by Franz Reichle.

2| "Daltonian" refers to the X-chromosome linked condition involving either the loss or the alteration of the gene encoding for medium or long wavelength cone pigments. Phenotypically, the hereditary condition is known as dichromacy (loss of one class of cones) or anomalous trichromacy (when one class of cone is altered in its spectral sensitivity). Incidence varies with race, its being most common among Europeans, and with gender (7.4% in males vs. 0.5% in females).

Valérie Bonnardel holds a PhD in neuroscience from the University Pierre et Marie Curie, Paris, France. She is a Reader in Experimental Psychology at the University of Winchester, England. Her research interest concerns human colour vision from the sensory level to cognitive processing including memory, naming, categorisation and preferences. She held the Colour Research Chair at the National Institute of Design in Ahmedabad, India, where she conducted a research programme on individual differences and cultural influences on colour perception. For more details, see: http://www.winchester.ac.uk/academicdepartments/psychology/staff/Pages/DrValerieBonnardel.aspx

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The Lackluster Role of Misperceptions in an Enactivist Paradigm

Davood G. Gozli
University of Macau, China
gozli/at/umac.mo

> Upshot • While the objectivist view of perception provides us with a commonsensical starting point, it quickly gives rise to unsolvable puzzles. The enactivist view, on the other hand, starts by challenging common sense, but it does not lead to the same unsolvable puzzles of the objectivist line of thought. Enactivism does not deny perceptual illusions or individual differences; it simply strips them of the status of perennial philosophical puzzles.

« 1 » From a naïve perspective, colors do not immediately pose philosophical problems. The colors of objects, just like their shapes or edges, appear to be perceptible attributes. They can be experienced by us, but they do not depend on us. The naïve perspective also gives us a criterion for deciding whether a color perception is illusory or veridical. Namely, an instance of (subjective) color perception is veridical only if the perceived color exists out there, so to speak, objectively.

« 2 » Although the naïve perspective does not immediately appear to be problem-